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Axatilla ARIPOV,
Toshkent davlat texnika universiteti tayanch doktoranti
E-mail:axatillaaripov56@gmail.com
Sadritdin TURABDJANOV,
Toshkent davalat texnika universiteti rektori
E-mail: Tur_sad_@mail.ru
Orifjon QODIROV,
O‘zMU dotsenti
E-mail: orifjon.678@mail.ru
Latofat RAXIMOVA,
Toshkent davalat texnika universiteti professori
E-mail: latofat.2011@mail.ru
Marat MUXAMEDJANOV,
Toshkent davalat texnika universiteti k.f.n. dotsenti
E-mail: muxamedjanovmarat_@mail.ru

Tosh.D.T.U. k.f.n. dotsenti M.Muxamedjanov taqrizi asosida

RESEARCH ON THE THERMAL STABILITY OF BIOCOAMIR OBTAINED ON THE BASIS OF *PLATANUS ORIENTALIS* AND *PINUS PONDEROSA* LEAF LITTER.

Annotation

Maple and pine trees received new biofuels based on leaf waste. Activation capabilities have been researched. The result is a study of the possibility of obtaining resistant biofuels from adsorbency-specific 337 ºC perturbation to 346 ºC perturbation with a microstructure size of 1.67 nm and a specific surface area of 46.9 m^2/g.

Key words: Biocoamir, stability, endothermic effect, exothermic effect, waste.

ИССЛЕДОВАНИЕ ТЕРМИЧЕСКОЙ СТАБИЛЬНОСТИ БИОУГЛЯ, ПОЛУЧЕННОГО НА ОСНОВЕ ОТХОДОВ ЛИСТЬЕВ *PLATANUS ORIENTALIS* И *PINUS PONDEROSA*.

Аннотация

Новые биоугли были получены на основе листовых отходов кленов и сосен. Были исследованы возможности активации. В результате изучается возможность получения биоугля с адсорбционными свойствами размером микропор 1,67 нм и удельной поверхностью 46,9 $м^2$/г, устойчивого к температурам от 337 ºC до 346 ºC.

Ключевые слова: Биоуголь, устойчивость, эндотермический эффект, экзотермический эффект, отходы.

***PLATANUS ORIENTALIS* VA *PINUS PONDEROSA* BARG CHIQINDILARI ASOSIDA OLINGAN BIOKO‘MIRNING TERMIK BARQARORLIGINI TADQIQ ETISH**

Annotatsiya

Chinor va qarag‘ay daraxtlari barg chiqindilari asosida yangi bioko‘mirlar olindi. Aktivlashtirish imkoniyatlari tadqiq etildi. Natijada mikrog‘ovaklar o‘lchami 1,67 nm va solishtirma yuzani 46,9 m^2/g bo‘lgan adsorbentlik xususiyatli 337ºS haroratdan 346 ºS haroratgacha chidamli bioko‘mirlar olish imkoniyati o‘rganildi.

Kalit so‘zlar: Bioko‘mir, barqarorlik, endotermik effekt, ekzotermik effekt, chiqindi.

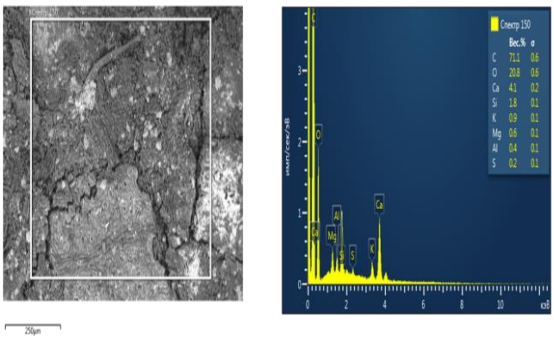
Kirish. Bugungi kunda atrof-muhitni organik va noorgnik tarkibli birikmalar bilan ifloslanish xavfi ortib bormoqda. Ayniqsa toksikantlarni oqova suvlar tarkibida uchrashi samarali va ekologik toza usullar orqali suvlarni zararsizlantirishni talab etadi. Bioko‘mirlarni olish va ulardan adsorbentlar sifatida foydalanishga qiziqishlarni ortishi ularning sorbsion va ion almashinish xossalari bilan tushintiriladi. Bioko‘mirlar toksik metallarni sorbsiyalash qobilyatlari shuningdek, ularni regeneratsion xususiyatlarini qulay, sodda ekanligi tufayli ushbu tadqiqot ishi olib borildi.

Mavzuga oid adabiyotlar tahlili. Qishloq xo‘jaligi chiqindilari asosida ya’ni, guruch po‘stlog‘i, guruch somoni, makajo‘xori poyasi chiqindilari asosida piroliz usulida olingan bioko‘mirlar [1] yuqori 900 ºS haroratlarga chidamli ekanligi tadqiq etilgan [2]. Yog‘och qipig‘i asosida termik barqarorligi 650 ºS harorat bo‘lgan bioko‘mir sintez qilingan [3]. Turli xil faollashtirish jarayonlari natijasida olingan bioko‘mir termik barqarorligi, 61,5–62,7% ga oshirilgan, kimyoviy oksidlanishdan keyin esa 15,2–17,2% yuqori uglerod yo‘qotilishi aniqlangan [4]. Yog‘och po‘stlog‘i va tovuq chiqindilari asosida piroliz usulida olingan bioko‘mirlar yuqori 650 ºS da 11000 ºS haroratlarga chidamli ekanligi va kadmiy ionlariga nisbatan sorbsioni xususiyatlari tadqiq etilgan [5]. Bug‘doy somonini piroliz qilingan va tarkibidagi uglerod soni termogravimetrik tahlili amalga oshirilgan. Natijada 500 ºS harorat bo‘yicha uglerod yo‘qotilishi 51,7% dan 35,5% -47,7% gacha kamayishi tadqiq qilingan [6]. Makkajo‘xori va poliyetilenglikol (PEG) to‘ldirilib piroliz usulida bioko‘mir olingan. Mikro-morfologiyasi, o‘ziga xos sirt yuzasi, g‘ovak tuzilishi va sirt xususiyatlari skanirlash elektron mikroskopi yordamida o‘rganilib va bir biriga solishtirilgan [8]. Ushbu tadqiqot shuni ko‘rsatdiki, piroliz usulida yog‘och qipig‘i va tovuq axlati 550-650 ºS xavosiz sharoitda yondirildi va biokumir olish usuli organildi tadqiq etildi [9]. Ushbu tadqiqot ishida 5 xil chiqindi: yog‘och qipig‘i va daraxt barglari, qog‘oz tegirmoni loyi, parranda axlati, sigir go‘ngi piroliz usulida 400-550 ºS qizdirilib chidamli ekanligi tadqiq etilgan [10]. Qahva

barglari [11], vinochilik sanoati chiqindilari [12], qarag‘ay o‘rmon qoldiqlari [13], kokos daraxti po‘stlog‘i [14], Sativa urug‘laridan foydalanib [15] bioko‘mir olingan va ularning termik barqarorligi DTA-TG tahlili olib borilgan hamda Fur’ye-IQ-spektroskopiya usulida hosil bo‘lgan funksional guruhlari aniqlangan.

Tadqiqot metodologiyasi. Tadqiqot uchun zaruriy xom-ashyolar *Platanus orientalis* va *Pinus ponderosa* barg chiqindilari bo‘lib, Toshkent shahrining Olmazor tumani avtomobil qatnovi yo‘llari bo‘yidan kuzgi xazorezgilik vaqtlarida yig‘ib olingan. Barg chiqindilarini changlardan tozalab olish uchun suv bilan bir necha marta yuvilib, quyoshda 3 kun davomida quritilgan. So‘ngra presslab, yaratilgan piroliz reaktoriga joylandi. Piroliz harorati 450-550 ºS, jarayon 4 soatni tashkil edi. Bioko‘mirni termik barqarorligini tahlil etish usullaridan DTA/TGA, kullilik darajasini aniqlash bo‘yicha tadqiqotlar olib borildi. Termogravimetrik tahlil MILTER kompaniya tomonidan yaratilgan SDTGA6000DSC 1 modeli (AQSH) qurilmasidada boshlang‘ich 300 ºS haroratdan boshlab 950 ºS haroart oralig‘ida olib borildi.

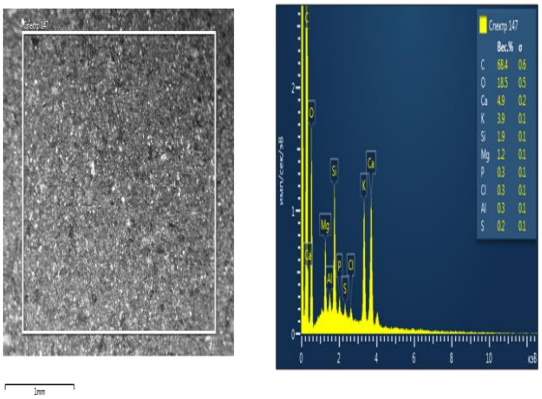
Tahlil va natijalar. Piroliz jarayoni natijasida olingan bioko‘mirlar chuqur o‘rganilishi asosida ularning adsorbentlik xususiyatlariga baho berish mumkin bo‘ladi. Shu sababdan, olingan bioko‘mirning dastlab SEM tasvirlari va element tahlili muhokama qilindi (1,2-rasmlar).



A) B)

1- rasm. Chinor barg chiqindilari asosida olingan bioko‘mirning aktivlashtirishdan keyingi SEM tasviri (A) hamda element tahlili

Ushbu 1-rasmdagi SEM tasvirida piroliz natijasida olingan bioko‘mirning g‘ovaklarini o‘rganish bo‘yicha tahlil qilindi. Tasvirlar uchastka o‘lchami 250 nm sohada olingan. Ko‘rinib turibdiki, bioko‘mirda mikrog‘ovaklar mavjud bo‘lib, ularning o‘lchami 1,4nm ga teng. Solishtirma yuzasi esa benzol bug‘larini o‘tkazish asosida aniqlanganda 34,29m^2/g. Element tahlili natijalaridan 71,1% C, 20,8% O, 4,1% Ca atomlaridan iborat ekanligini ko‘rish mumkin. Bioko‘mirning g‘ovaklarini ochish maqsadida suv bug‘laridan foydalanilgan va aktivlashtirilgan. Natijalar asosida aktivlashtirish natijasida mikrog‘ovaklar o‘lchami 1,67 nm va solishtirma yuzani 46,9 m^2/g o‘zgarishini shuningdek, ortiqcha miqdordagi ishqoriy metallardan xalos bo‘lish mumkinligi o‘rganildi.

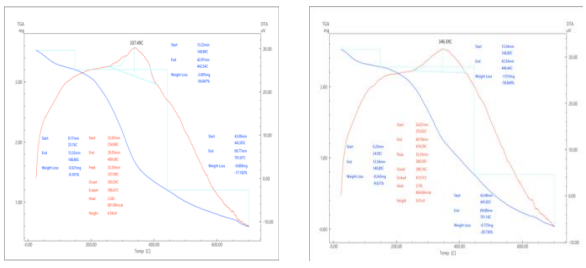


A) B)

2- rasm. Chinor barg chiqindilari asosida olingan bioko‘mirning aktivlashtirilmagan SEM tasvirlari (a), element tahlili (b).

Ushbu tasvirlardan chinor daraxti barglari asosida olingan bioko‘mir tarkibidagi uglerod miqdori nisbatan kamligini 68,4% ekanligi aniqlandi. Ishqoriy metallardan kalsiy 4,9% hamda kaliy 3,9% miqdorni tashkil etishi bioko‘mirni suv bug‘lari bilan aktivlashtirish maqbul ekanligini isbotladi. Ishqoriy metallarni suv bug‘lari bilan yuvilib ketishi bioko‘mirning adsorbentlik xosslarini yaxshilanishiga olib keladi [16].

Olingan bioko‘mirning termik barqarorligini aniqlash eng asosiy ekspluatatsion ko‘rsatkichlar qatoriga kirib [17], adsorbentlik xususiyatini oshirish bilan bir qatorda, toksik metallarga nisbatan sorbsion xossalarini yaxshilaydi [18].



A) B)

2-rasm. Chinor (a) va qarag‘ay daraxti (b) barglari chiqinidilari asosida olingan bioko‘mirning termik barqarorligi tadqiqi.

Tadqiqotning differensial-termik tahlili (a) bioko‘mirni 337,49ºS haroratgacha chidamli ekandigini ko‘rsatdi. Dastlabki 1,7-13 daqiqa oralig‘ida 50-148ºS haroratlarda suvni yo‘qotilish endoeffektlari kuzatildi. Aynan shu vaqt oralig‘ida massaning umumiy yo‘qotilishi 9,1% ni tashkil etdi. Jarayonni 442ºS haroratgacha ko‘tirilishi va 42-45 daqiqa davom ettirilishi massani 56,87%ga kamayishiga olib keldi.

Qarag‘ay daraxti barglari asosida olingan bioko‘mirning (b) dastlabki 25 daqiqa ichidagi 125ºS haroratda massani 9% yo‘qotilishi suv bug‘lari bilan bog‘liq endoeffektlarni berdi. Keyingi 35 daqiqa ichida 346,59 ºS haroratda yuqori ko‘tarilgan ekzoeffektni kuzatilishi massani 28%ga yaqin kamayishiga olib keldi.

Xulosa. Tadqiqotlar natijasida chinor va qarag‘ay daraxtlari barg chiqindilari asosida adsorbentlik xususiyatli yangi bioko‘mirlar olish imkoniyati mavjudligi isbotlandi. Bioko‘mirni aktivlashtirish nafaqat g‘ovaklarini ochilishiga balki, keraksiz miqdordagi ishqoriy metallarni yuvilib ketishiga olib keladi. Termik tahlillar natijasida bioko‘mirlarning yuqori haroratlarga chidamli ekanligi va ularni adsorbentlar sifatida qo‘llash mumkinligini isbotladi.

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